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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/690,928 | 10/22/2003 | Dong-Ho Han | P16829 | 6901 |
| 28062 | 7590 | 07/08/2005 | EXAMINER | |
| BUCKLEY, MASCHOFF, TALWALKAR LLC | | | LE, THAO X | |
| 5 ELM STREET | | | ART UNIT | PAPER NUMBER |
| NEW CANAAN, CT 06840 | | | 2814 | |

DATE MAILED: 07/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/690,928

Applicant(s)

HAN ET AL.

Examiner

Thao X. Le

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-7 and 29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-7 and 29 is/are rejected.
- 7) ☒ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Allowable Subject Matter

1. The indicated allowability of claim 29 is withdrawn in view of the newly discovered reference to Brandt et al. (6068782). Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
4. Claims 2-7 and 29 are rejected under 35 U.S.C. 103(a) as being obvious over US 6068782 to Brandt et al. in view of US 6236572 to Teshome et al.

Regarding claim 2, Brandt discloses an apparatus in fig. 6 comprising: a substrate 110, column 3 line 7, a pair of signal traces 150/100, column 3 line 8, formed directly on the substrate 110 and spaced from each other; a filler material 120/130, column 3 lines 12 and 27 on the substrate 110 and between the signal traces 150/100, the filler material 130 having a dielectric constant that is higher than a dielectric constant of a material of which the substrate is formed.

But, Brandt does not disclose an apparatus comprises a solder mask layer on the signal traces and on the filler material, the dielectric constant of the filler material being higher than a dielectric constant of the solder mask layer.

However, Teshome discloses an apparatus in fig. 6A comprises a solder mask layer 154 on the signal traces 160 directly on the FR4 substrate 156, column 6 line 3, and on the filler material 134, column 5 line 16. At the time the invention was made; it would have been obvious to one of ordinary skill in the art to use the solder mask layer teaching of Teshome with Roth, because it would have provided the protection to the conductive layer and control the flow of the solder as taught by Teshome, column 5 lines 40-43.

With respect to 'the dielectric constant of the filler material being higher than a dielectric constant of the solder mask layer', it would be obvious that the filler material 412 of Roth would have higher dielectric constant than a dielectric constant of the solder mask layer 154 of Teshome, because the solder mask of Teshome is substantially identical to that of the claims, claimed properties or

functions are presumed to be inherent or obvious. *In re Best*, 195 USPQ 430, 433 (CCPA 1977) and MPEP 2112.01.

With respect to 'filler material having dielectric constant higher than a dielectric constant of the substrate', Brandt disclose the substrate 110 comprise PCB that is typically having the dielectric constant of about 4.3, see Teshome column 6 line 35, while the layer 130 has higher dielectric constant, column 3 line 35, comprising polymer and metal oxide, column 4 line 19.

Regarding claim 3, Brandt discloses the apparatus of claim 2, wherein the substrate 110 includes a resin in which fiber are embedded (FR4 PCB typically comprises epoxy resin and fiber glass, see 6826333 in column 8 lines 43-46), the dielectric constant of the filler 130 material being higher than a dielectric constant of the resin.

Regarding claim 4, Brandt discloses the apparatus of claim 2, wherein the signal traces 150/100 are formed of copper, column 4 line 53.

Regarding claims 5-6, Brandt discloses the apparatus of claim 2, wherein the filler material substantially fills a space between the signal traces 150/100, wherein the filler material 120 has a height that is substantially equal to a height of the signal traces, fig. 6.

Regarding claim 7, Brandt discloses the apparatus of claim 2, wherein the filler material 130 has a dielectric constant in excess of 4.

The layer 130 has higher dielectric constant, column 3 line 35, comprising polymer and metal oxide, column 4 line 19. Such material obviously would have dielectric higher than 4 (see 6910266 to Lee in column 10 lines 22-24).

Regarding claim 29, Brandt discloses the apparatus of claim 2, wherein the filler material 130 includes polyvinylidene difluoride (PVDF), column 4 line 22.

Response to Arguments

5. Applicant's arguments filed on 27 June 2005 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao X. Le whose telephone number is (571) 272-1708. The examiner can normally be reached on M-F from 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M. Fahmy can be reached on (571) 272 -1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Thao X. Le
05 July 2005



LONG PHAM
PRIMARY EXAMINER